

Massive cuff tear

Massive tear Tear >5 cm [Cofield]
 >2 or more tendon [Zumstein]
 Tear: Crescent: easy to repair
 U shape: difficult to repair

Prevalence 10% to 40% of all rotator cuff tears.

Massive rotator cuff tears are not necessarily synonymous with irreparable tears. Technical and biological challenges to a successful repair include inelastic poor-quality tendon tissue, scarring, muscle atrophy, and fatty infiltration. Fatty infiltration of the involved rotator cuff muscles has been identified as an important negative prognostic factor for the outcome after repair of massive rotator cuff tears.

Arthroplasty can be considered for the treatment of symptomatic massive rotator cuff tears in patients who have glenohumeral arthritis.

Pathomechanics

1. Force couple: The rotator cuff musculature acts as a dynamic stabilizer to the glenohumeral joint, centering the humeral head on the glenoid. This force couple disrupted when there is a massive tear of rotator cuff. This pulls humerus superiorly.

Clinical features:

Patients may report varying degrees of weakness and varying losses of the range of motion.

May have visible atrophy of the supraspinatus and/or infraspinatus muscles.

1. Lag signs are strongly positive
2. Complete loss of external rotation strength
3. A positive hornblower sign—i.e., they may be unable to externally rotate the shoulder (the motion required for a hornblower to get the horn to the lips with the arm)

at the side). An inability to complete this action without abducting the arm to avoid active external rotation reflects deficiency of teres minor function. Walch et al. found this sign to be 100% sensitive and 93% specific in terms of identifying irreparable tears of the teres minor

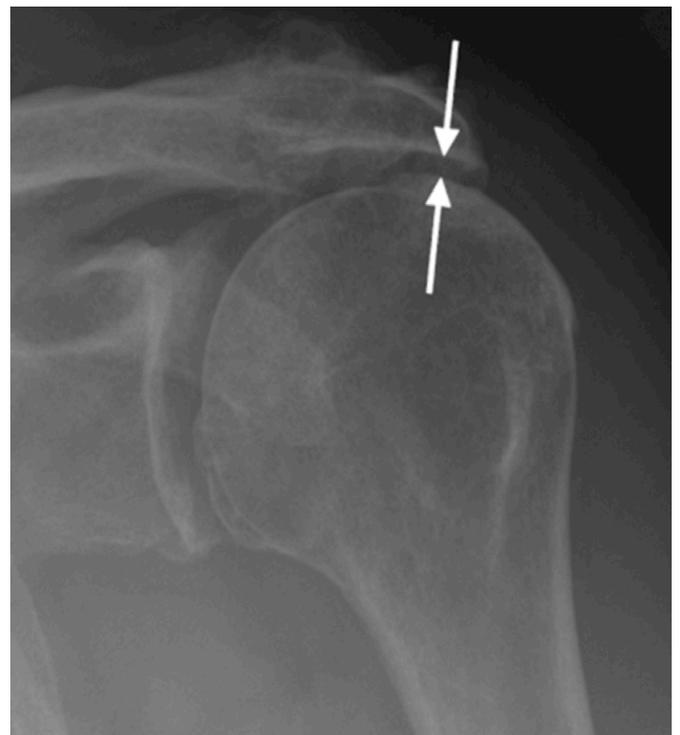
4. Positive belly-press and lift-off tests

5. Pseudoparalysis

In pseudo paralysis, on abduction: the elevation was limited to 60°, and the arm fell into internal rotation with any attempt to elevate it anteriorly. This is due to massive rupture involving supraspinatus and infraspinatus.

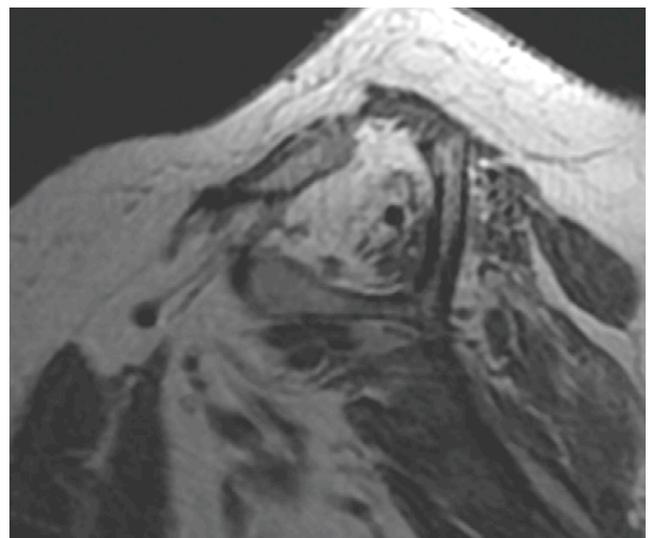


1.X ray: A decreased acromiohumeral distance less than 7 mm



2. MRI

1. Tear patterns,
2. Grading of the severity of fatty infiltration of muscle [Goutallier stage]
3. Coexistent intra-articular pathological



involvement of the labrum or biceps tendon.

Signs of irreparability include

1. Static superior migration of the humeral head,
2. A narrowed or absent acromiohumeral interval,
3. Fatty infiltration affecting >50% of the
4. Inelastic poor-quality tendon tissue,

Fatty infiltration of the involved rotator cuff muscles has been identified as an important negative prognostic factor for the outcome after repair of massive rotator cuff tears.

Tendon transfer is a good option for young patients and manual laborers with an irreparable massive rotator cuff tear.

Arthroplasty can be considered for the treatment of symptomatic massive rotator cuff tears in patients who have glenohumeral arthritis. [Reverse shoulder arthroplasty]

Treatment

1. Non operative treatment:

Bokor et al. noted improvement in 50% to 85% patients after nonoperative treatment of a full-thickness rotator cuff tear. :effective system for rehabilitation and “re-education” of the anterior deltoid muscle to compensate for a deficient rotator cuff. Despite clinical improvement, however, glenohumeral osteoarthritis progressed, the acromiohumeral distance decreased, and fatty infiltration of the involved muscles.

12 Debridement and acromioplasty

Rockwood suggested acromioplasty and debridement of torn tendon for an irreparable rotator cuff tears. Some surgeons use latissimus transfer for irreparable cuff. He reported 83% good to excellent results.

But recent study [Hawkins] has questioned this as only 25% will have good results. Zvijac reported deterioration of function and strength over time.

3. Biceps Tenotomy

The function of the long head of the biceps tendon, particularly in the setting of a massive rotator cuff tear, is controversial. Recent electromyographic studies have shown the long head of the biceps to be quiescent in patients with a massive cuff tear during active abduction, suggesting that its stabilizing role is likely more passive than active there is evidence suggesting that the long head of the biceps tendon may be a source of pain and contribute to the discomfort associated with symptomatic massive cuff tears. Walch et al. reported the outcomes after biceps tenotomy in patients with an irreparable massive rotator cuff tear.

4. Partial Repair

Partial repair has been shown to yield a good outcome in some patients who have a massive rotator cuff tear, and this method should be considered in the setting of good tissue quality. Often, isolated repair of the infraspinatus tendon to bone can significantly improve external rotation strength and functional outcomes, even if the supraspinatus tendon cannot be repaired.

In this capacity, margin convergence sutures that improve the mechanical advantage of the rotator cuff can restore the balance of coronal and transverse force couples.

Duralde patients in whom a complete repairs to bone was not achievable.

Good-to excellent.

5. Complete Repair

Even if a direct repair of tendon to bone is achievable, it is often difficult to reliably achieve long-term healing with a structurally intact repair. A re-tear rate that is distinctly higher than that associated with smaller tears.

- a. Subdeltoid adhesions should be released and bursal tissue should be excised
- b. Use of a margin convergence technique.
- c. Capsular releases may also be required to address particularly contracted or immobile tendons in massive tears.
- d. Bigliani described an open anterior interval release of the coracohumeral ligament to the base of the coracoid process.
- e. A second posterior interval slide, or blunt release between the supraspinatus and infraspinatus tendons, may occasionally be required.

Snyder et al. advocated performing a medialized repair with a single row of sutures placed at the articular margin.

Zumstein : re-tear rate of 37%.

Lam: 84% of the patients were satisfied and 93% had pain relief.

Jost: Correlated significantly with the size of the recurrent defect and the extent of fatty degeneration of the infraspinatus and supraspinatus muscles.

6. Repair with Scaffolds or Tissue Augmentation

Scaffolds provide mechanical support and have biological properties that may favorably influence cell proliferation and differentiation, hopefully improving tendonto-bone healing. Currently, scaffolds derived from dermis, small intestinal submucosa, skin, fascia lata, and pericardium have been processed and marketed for augmentation in the repair of massive tears. Results are not encouraging

7. Tendon Transfers

The ideal candidate for this operation is a patient who does not have glenohumeral arthritis but has impaired function related to weakness and loss of external rotation. Manual laborers with a massive irreparable tear who require strength to perform occupational tasks often fall into this category.

Latissimus Dorsi Transfer : Transfer of the tendon of the latissimus dorsi muscle to reconstruct a massive posterosuperior rotator cuff tear [Gerber]

The subscapularis tendon and deltoid muscle origin must be intact for the transfer to establish balanced coronal and transverse force couples about the glenohumeral joint. Iannotti et al. reported a 64% rate of satisfactory results.

b. Pectoralis Major Transfer :The pectoralis major tendon transfer has been described for patients with a massive irreparable tear of the subscapularis tendon. Preferred technique, the sternal and clavicular heads of the pectoralis muscle are separated to allow detachment of only the tendon of the sternal head for the transfer.

8. Hemiarthroplasty

Neer et al. characterized rotator cuff arthropathy as superior subluxation of the humeral head, a decreased acromiohumeral distance with acetabularization of the acromion.

Hemiarthroplasty is a treatment option for patients with symptomatic rotator cuff arthropathy.

Overall, a successful result was reported in 67% of the cases.

9. Reverse Shoulder Arthroplasty

Reverse total shoulder arthroplasty has recently emerged as a treatment for glenohumeral arthritis in the setting of advanced rotator cuff arthropathy. A standard shoulder replacement is contraindicated in the absence of a functional rotator cuff because loss of a balanced coronal force couple subjects the glenoid component to excessive shear forces with contraction of the deltoid. This so-called rocking-horse phenomenon leads to early failure secondary to glenoid loosening.

These designs increased the efficiency of the deltoid by (1) medializing the center of rotation and thereby decreasing shear forces on the glenoid, and (2) tensioning the deltoid by effectively lengthening the arm.

The prosthetic survival rate was 91% at five years and 75% at seven years but declined substantially, to 30%, at eight years.

Despite favorable short-term clinical results, the high rate of complications associated with this operation is a substantial concern.

19% complication rate: The most common complications were dislocation (7.5%) and infection (4%). Glenoid fractures, humeral fractures, pain associated with implants, radial nerve palsy, and loosening of the glenosphere.

Scapular notching is also a concern and is related to impingement of the medial aspect of the humeral cup on the scapular neck in adduction. The clinical implications of notching are controversial.

Notching is clearly related to the surgical technique and can be decreased with inferior baseplate positioning and superior tilting of the glenosphere.

